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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEVIN R. KEEGAN, AMANDA M. WEISS,
and CHARLES R. DEJOHN

Appeal 2010-007569
Application 10/801,740
Technology Center 1700

Before CATHERINE Q. TIMM, MICHAEL P. COLAIANNI, and GEORGE C. BEST, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1-19. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We REVERSE.

Appellants' invention is said to be directed to a catalytic hydrocarbon reformer and methods of operating catalytic hydrocarbon reformers that include a strategy and algorithm for calculating a reformer combustor burn

time for heating the reformer catalyst to a minimum reforming temperature (Spec. 1:8-11; Claims Appendix, claims 1, 6, 10 and 15).

Claims 1 and 6 are reproduced below:

1. A method for pre-heating a hydrocarbon catalytic reformer from a starting temperature to a minimum reforming temperature utilizing an electronic control module, comprising the steps of:

a) selecting a fuel type to be combusted;

b) determining the latent heat of combustion of said selected fuel type;

c) selecting a flow rate of said combustion fuel;

d) determining the heat capacity of a catalyst to be heated in said catalytic reformer;

e) determining a mass of said reformer to be heated;

f) determining said starting temperature of said catalyst in said catalytic reformer;

g) utilizing a software construct to produce said fuel combustion time interval, wherein said construct utilizes said latent heat of combustion, said selected combustion fuel flow rate, said heat capacity of said catalyst, said mass to be heated, and said starting temperature; and

h) pre-heating said hydrocarbon catalytic reformer using a combustor for said fuel combustion time interval so that said hydrocarbon catalytic reformer reaches said minimum reforming temperature.

6. A catalytic hydrocarbon reformer for making reformate, comprising:

an electronic control module for controlling the flow of hydrocarbon fuel and air into said reformer,

wherein said electronic control module is programmed with a software construct for determining a fuel combustion time interval for pre-heating said hydrocarbon catalytic reformer to a minimum reforming temperature, wherein said fuel combustion time interval is at least dependent on a starting temperature of a catalyst in said reformer.

Appellants appeal the following rejections:

1. Claims 1-5, and 10-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dalla Betta (US 2003/0101713 A1, pub. Jun. 04, 2003) in view of Yamaoka (US 2002/0071974 A1, pub. Jun. 13, 2002).
2. Claims 6 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamaoka.
3. Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamaoka in view of Della Betta.
4. Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamaoka in view of Grieve (US 2002/0150532 A1, pub. Oct. 17, 2002).

REJECTIONS (1), (3), and (4)

ISSUE

Did the Examiner reversibly err in determining that Yamaoka teaches measuring and calculating times necessary for the catalyst to reach its activating temperature such that Yamaoka's teachings would have rendered obvious a reformer comprising an electronic control module programmed with a "software construct for determining a fuel combustion time interval for pre-heating said hydrocarbon catalytic reformer to a minimum reforming temperature, wherein the fuel combustion time interval is at least dependent

on a starting temperature of a catalyst in said reformer" as recited in claim 6? We decide this issue in the affirmative.

FINDINGS OF FACT AND ANALYSES

The Examiner's findings regarding Yamaoka are presented on pages 5 to 6 and 7 to 8 of the Answer. The Examiner finds that Yamaoka teaches a quantity determinator and target temperature setting means for the raw fuel supplied to the combustor and that time is variable (Ans. 5). Based on these findings, the Examiner concludes that it would have been obvious to use a software construct "to measure the time necessary for heating the catalyst to a reformer temperature to compensate for the time necessary for the process to occur given the quantity of fuel used, the target temperature desired, and the activation temperature of the catalyst" (Ans. 5).

Appellants argue that Yamaoka fails to teach a software construct that determines the fuel combustion time interval based, at least, on the initial temperature of the reformer (App. Br. 10). Appellants argue that temperature setting means and quantity determinator are components that measure and control the raw fuel temperature and amount and these components do not determine a combustion time interval (App. Br. 12). Appellants further argue that the Examiner's stated conclusion is based on "measuring" the time necessary for heating the catalyst to a reformer temperature, which is not what is required by the claim (App. Br. 10). Appellants contend that claim 6 requires an electronic control module that determines the combustion time interval using a software construct (App. Br. 11).

Claim 6 recites an electronic control module that is programmed with a software construct that determines the fuel combustion time interval based, at least, upon the initial temperature of the reformer. The Specification describes the software construct as including an algorithm that calculates (i.e., determines) the fuel combustion time interval based on various parameters that include the initial temperature of the reformer (Spec. 4-6).

Accordingly, the Examiner's conclusion based on "measuring" the time for the reformer to reach a minimum temperature does not take into account the subject matter of the claimed invention that requires a software construct that "determines" (i.e., calculates) the fuel combustion time interval. Apparently recognizing this deficiency, the Examiner in the Response to Arguments section of the Answer finds that Yamaoka teaches measuring and calculating times necessary for fuel to reach its desired temperature and the catalyst to reach its activating temperature (Yamaoka, para. [0008]).

However, paragraph 8 of Yamaoka does not explicitly teach calculating times for the reformer catalyst to reach its desired temperature as argued by Appellants (Reply Br. 3-4). The Examiner has not explained or provided reasoning as to how, why, or what portion of Yamaoka's paragraph 8 disclosure teaches calculating the fuel combustion time interval. The Examiner has not dispensed with the initial burden of establishing a prima facie case of obviousness.

On this record the preponderance of the evidence favors Appellants' argument that the subject matter of claim 6 would not have been obvious over Yamaoka.

The § 103 rejections of claims 8 and 9 are based on Yamaoka as the primary reference and these rejections fail for the same reasons discussed *supra*.

REJECTION (2)

ISSUE

Did the Examiner reversibly err in determining that Dalla Betta teaches measuring a "fuel combustion time interval" as required by claims 1, 10, and 15? We decide this issue in the affirmative.

FINDINGS OF FACT AND ANALYSIS

The Examiner's stated rejection is based on Dalla Betta teaching a fuel combustion time interval (Ans. 3). Specifically, the Examiner cites paragraph 101 of Dalla Betta as teaching the "length of time for fuel processing," and the Examiner finds that the only claim limitations missing from Dalla Betta are the "details of a software construct [claims 1, 10, 15], a computing system [claim 10], or computer readable medium [claim 15]" (Ans. 3). The Examiner relies on Yamaoka to teach using a software construct (Ans. 3-4).

Appellants argue that Dalla Betta and Yamaoka do not teach using a starting temperature of the catalytic reformer in a software construct to produce a combustion time interval (App. Br. 18). Appellants further argue that the Examiner's reliance on paragraph 101 of Dalla Betta to teach a length of time for fuel processing in rich mode does not teach a fuel combustion time interval to preheat the catalyst (App. Br. 19).

We have reviewed the Dalla Betta disclosure and we find ourselves in agreement with Appellants. The Examiner has not sufficiently explained how the paragraph 101 Dalla Betta disclosure teaches the disputed fuel combustion time interval for preheating the reformer catalyst limitation. The paragraph 101 disclosure states that the "length of time the fuel processor is operated in the rich mode" is a variable that can be determined. However, we agree with Appellants that this disclosure refers to the operation of the fuel processor at normal operation conditions. The Examiner has not directed us to any citation or provided any reasoning as to why this disclosure should be interpreted as referring to the fuel combustion time interval for preheating the reformer as required by the claims. We note the Examiner does not respond to Appellants' argument challenging the finding regarding Dalla Betta's paragraph 101 disclosure (Ans. 8-10).

For these reasons and on this record, we find that the preponderance of the evidence favors the Appellants' position that the claims would have been nonobvious over Dalla Betta and Yamaoka.

We reverse the Examiner's § 103 rejection over Dalla Betta in view of Yamaoka.

DECISION

The Examiner's decision is reversed.

ORDER

REVERSED

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